

REMARKS

Claims 1-41 are all the claims pending in the application. New claims 39-41 have been added to further define the invention. Reconsideration and allowance of all the claims are respectfully requested in view of the following remarks.

Drawings

The Examiner objected to the drawings as including informalities.

First, the Examiner requested that Fig. 14 be designated by a legend such as --Prior Art-- because only that which is old is illustrated. Applicants have filed herewith proposed drawing corrections that label Fig. 14 as "Prior Art".

Second, the Examiner objected to the drawings as including the reference "23" which is not mentioned in the specification. Applicants respectfully traverse this objection because reference numeral "23" is, indeed, described in the specification as being an aligned film. See page 44, 1st full paragraph, for example.

Specification

The Examiner objected to the specification as including informalities.

First, the Examiner requested Applicants' cooperation in correcting any minor errors of which they are aware. At this time, Applicants are unaware of any such errors in the specification.

Second, the Examiner objected to the summary of the invention as not complying with the requirements as set forth in 37 C.F.R. § 1.73 because it is too long, it refers to the prior art, and also refers to the drawings. Applicants respectfully traverse this objection for the following reasons.

Section 1.73 does not set any particular word limit on the summary of the invention. Therefore, there is no basis for the Examiner asserting that the summary is too long. Further, §1.73 does not prohibit a comparison of the invention to the prior art, nor does it prohibit reference to the drawings. The summary of the invention is compared to the prior art on pages 6

and 7 so as to highlight the invention's nature and substance. Therefore, the summary of the invention indicates its nature and substance, and is commensurate with the invention as claimed, which are the requirements of §1.73. Therefore, the summary of the invention, as written, is in compliance with §1.73.

Third, the Examiner objects to the description of Fig. 13 as being unclear in comparison with the structure of the device as shown in the drawings. In particular, the Examiner asserts that Fig. 13 shows a physical structure of the liquid crystal display, whereas the description on page 10 states that Fig. 13 shows a relationship between refractive index and an optical path. In response, Applicants have amended the specification so as to more accurately reflect that depicted in Fig. 13.

Claim Rejections 35 U.S.C. § 112

The Examiner rejected claims 1-5, 7, 8, 10, and 11, under §112, 2nd paragraph as indefinite. The Examiner noted specific instances of alleged indefiniteness in claims 1 and 8. Applicants have amended claim 1 to clarify that the transparent film may, indeed, include plural layers as described in the specification in connection with Fig. 1H. Further, Applicants have amended claim 8 so as to remove the specific examples of polygonal structure, which are then set forth in new dependent claims 39 and 40.

The Examiner objected to claims 6 and 9 as being of improper dependent form for failing to further limit the subject matter of a previous claim.

Specifically, the Examiner asserted that the range of inclination angles in claim 6 was broader than that in claim 1. Applicants have amended claims 1 and 6 to clarify that the range of angles in claim 1 pertains to a portion of the optical path changing slopes and, therefore, is not the only range of optical-path-changing-slope angles. Hence, the claim 6 recitation is proper.

Further, the Examiner asserted that claim 9 recites a component which is not a part of the film as recited in its base claim 1. Applicants agree with the Examiner, but note that claim 1 is thus broader than claim 9. That is, claim 1 sets forth the optical film using the open transition phrase "comprising" and, therefore, may include other elements not recited therein. Claim 9

then specifically mentions one of those elements—a reflection layer—not recited in claim 1. Therefore, claim 9 does further limit the optical film as set forth in claim 1.

Double Patenting

The Examiner rejected claims 1-5, 7, 8, and 10-12 under §101, statutory double patenting, over commonly assigned application Serial No. 09/756,792. Also, the Examiner rejected claims 1, 3-5, 7, 8, 10, and 11, under §101, statutory double patenting, over commonly assigned application Serial No. 09/774,618.

Under a statutory double patenting rejection, the critical question is whether the same invention is being claimed twice. “Same invention” means identical subject matter. *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1984); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA) 1970); and *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957). MPEP § 804.

A reliable test for double patenting under 35 U.S.C. § 101 is whether a claim in the application could be literally infringed without literally infringing a corresponding claim in the patent. *In re Vogel*. In the present situation, the test is whether claim 1 in the pending application could be infringed without literally infringing a corresponding claim in the ‘792 or ‘618 applications.

Claim 1 sets forth an optical film comprising a transparent film an adhesive layer provided on one surface of the transparent film, the adhesive layer having a refractive index different by 0.1 or less from a refractive index of a layer of the transparent film, and a repetitive prismatic structure provided on the other surface of the transparent film, wherein the prismatic structure comprises optical path changing slopes arranged within a particular angular range with respect to a plane of the transparent film.

On the other hand, each of claims 1-5, 7, 8, and 10-12, of the ‘792 application requires a polarizer and an adhesive layer having a particular refractive index with respect to the refractive index of one side of the polarizer surface. Thus, claim 1 here recites a transparent film, whereas ‘792 recites a polarizer. Clearly, claim 1 could be literally infringed without literally infringing the corresponding claims of ‘792 patent.

Turning to the '618 application, a similar analysis can be made. The claims of the '618 application require a transparent film, a hard coating layer on one surface of the transparent film, and an adhesive layer on the other side of the transparent film. Claim 1 of the present application does not require any hard coating layer on one surface of the transparent film. Thus, claim 1 of the present invention could be literally infringed without literally infringing the corresponding claims of the '618 application.

For the above reasons, there is no statutory double patenting between the claims of the present invention and those in each of the '792 and '618 applications. Because there is no conflicting subject matter, there is no need to state which entity is the prior inventor thereof.

Claim Rejections - 35 U.S.C. § 103

The Examiner rejected claims 1, 3-5, 7, 10, and 11, under § 103(a) as being unpatentable over EP 0 867 747 to Bao et al. (hereinafter Bao) in view of US Patent 5,390,276 to Tai et al. (hereinafter Tai). Applicants respectfully traverse this rejection because the references fail to establish *prima facie* obviousness in that they fail to teach or suggest every element of the invention as set forth in the claims.

Both Bao and Tai utilize light transmission in the inside of the light pipe. See column 10, lines 21-40 in Tai and Fig. 1 in Bao. In this type of system, a panel ("cell 12" in Tai and "0" in Bao) is disposed on the light pipe or backlighting system ("14" in Tai and "20" in Bao). Therefore, an increase of total thickness is not avoidable. In contrast, according to one embodiment of the present invention, light is transmitted inside of the liquid crystal panel portion in the LCD system to which the optical film is adopted. The transparent film in the optical film according to one embodiment of the present invention emits the light by its prismatic structure, it is not intended to transmit light in its internal space. (1)

Thus, a transparent film would not be adopted in the Bao and Tai because the light pipe in those references plays a role of not only emission of light but also transmission of light.

More specifically, turning to the language of the claims, Applicants have the following additional comments.

Claim 1 sets forth an optical film comprising a transparent film, an adhesive layer on one surface of the transparent film and having a refractive index different by 0.1 or less from a refractive index of a layer of the transparent film, and a repetitive prismatic structure provided on the other surface of the transparent film.

For example, as shown in Fig. 1H, one embodiment of the present invention comprises an optical film 1 comprising a transparent film 11, an adhesive layer 12 on one surface of the transparent film and having a refractive index different by 0.1 or less from a refractive index of a layer 11A of the transparent film 11, and a repetitive prismatic structure 13 provided on the other surface of the transparent film 11. As set forth in the specification, the transparent film has a thickness on the order of micrometers so that a display device made therefrom is small in thickness.¹ The optical film of the present invention was made to replace the light pipes and/or light diffusing plates of the prior art, because such structures have a thickness on the order of millimeters, which makes it hard to reduce the thickness and weight of a display device.²

In contrast to that set forth in claim 1, Bao and Tai each disclose light pipes and/or light guiding plates having a thickness on the order of millimeters. Specifically, Bao teaches a light guiding plate 20 having a thickness of about 3 mm.³ Similarly, Tai teaches a light pipe 14 made of sections 40 that are 6 mm high.⁴ Therefore, for the sake of argument, even assuming one of ordinary skill in the art were motivated to combine Bao and Tai as suggested by the Examiner, any such combination would still not teach or suggest a transparent film, as set forth in claim 1.

For the above reasons, Bao and Tai fail to render obvious claim 1. Likewise, Bao and Tai fail to render obvious dependent claims 3-5, 7, and 10-11. However, Applicants make the following additional arguments with respect to claims 5 and 11.

¹ Specification at page 29, lines 20-24.

² Specification at the paragraph bridging pages 1 and 2.

³ Bao at col. 14, lines 19-23.

⁴ Tai at col. 4, lines 23-30, 54-62, and col. 5, lines 35-41.

Claim 5 sets forth, in addition to that in claim 1, that the optical path changing slopes are formed based on a structure of grooves or protrusions each shaped substantially like a tetragon or a pentagon in section. In contrast to that set forth in claim 5, each Bao and Tai teach only grooves or protrusions that are triangular in section.

Claim 11 sets forth, in addition to that in claim 1, that the adhesive layer is of a light diffusion type. In contrast to that in claim 11, each of Bao and Tai teach an adhesive that is transparent. See Bao col. 12, lines 34-39, wherein it states that the intervening layer 40 is composed of "a transparent resin having adhesion." Also, note Tai col. 5, lines 30-35.

The Examiner rejected claim 2 under §103(a) as being unpatentable over Bao in view of Tai, and further in view of Japanese 11-142618 (hereinafter Japanese '618). Because this rejection is based on Bao and Tai, Applicants comments as set forth above are pertinent here and, therefore, are incorporated by reference. Further, Japanese '618 teaches a light diffusing sheet, but does not teach or suggest a transparent film as set forth in claim 1. Therefore, Japanese '618 does not teach or suggest that which Bao and Tai lack.

The Examiner rejected claim 8 under §103(a) as being unpatentable over Bao in view of Tai, and further in view of US Patent 5,485,291 to Qiao et al. (hereinafter Qiao). Again, because this rejection is based on Bao and Tai, Applicants comments as set forth above are pertinent here and, therefore, are incorporated by reference. Further, Qiao teaches a light guide 12 having a thickness on the order of 1 mm and, therefore, does not teach or suggest that which Bao and Tai lack.⁵

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

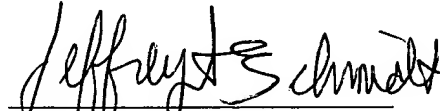
⁵ Qiao at col. 2, lines 38-46, and Figs. 1-2.

Amendment Under 37 C.F.R. § 1.111
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The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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APPENDIX
VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

On page 10, the 6th full paragraph has been amended as follows:

Fig. 13 is a sectional view showing an example of a liquid-crystal display device wherein light may be enclosed by the optical film due to interface reflection between the transparent film and the tacky layer due to the difference in refractive index therebetween [the relationship between a refractive index and an optical path]; and

IN THE CLAIMS:

The claims have been amended as follows:

1. (Amended) An optical film comprising:
a transparent film comprising at least one layer forming at least one surface of said transparent film;

an adhesive layer provided on said one surface of said transparent film, said adhesive layer having a refractive index different by 0.1 or less from a refractive index of [a] said at least one layer [of said one surface] of said transparent film; and

a repetitive prismatic structure provided on the other surface of said transparent film, said repetitive prismatic structure having optical path changing slopes at least a portion of which are aligned in a substantially constant direction at an inclination angle in a range of from 35 to 48 degrees with respect to a plane of said transparent film.

6. (Amended) An optical film according to claim 1, wherein a projected area, onto said film plane, of flat surfaces each having an inclination angle of not larger than 5 degrees with respect to said film plane is not smaller than 10 times as large as a projected area, onto said film plane, of the slopes each having an inclination angle of not smaller than 35 degrees with respect to said film plane.

8. (Amended) An optical film according to claim 1, wherein said prismatic structure having optical path changing slopes is formed into discontinuous grooves each shaped substantially like a polygon [such as a triangle, a tetragon, a pentagon] in section; wherein a length of each of said discontinuous grooves is not smaller than five times as large as a depth of each of said discontinuous grooves; wherein said optical path changing slopes are formed in a direction of the length of said grooves at an inclination angle in a range of from 38 to 45 degrees with respect to said film plane; and wherein a projected area of said discontinuous grooves onto an area of said film plane is not larger than 10%.

9. (Amended) An optical film according to claim 1, [wherein] further comprising a reflection layer [is] disposed closely on a surface of said transparent film on which said prismatic structure having said optical path changing slopes is formed.

New claims 39-41 have been added.